A Note on the Chromosome Number and Interrelationships in the Marine Gastropod Genus *Thais* of the United States Pacific Coast [1]

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(Plate 43)

Several species of marine snails belonging to the family Muricidae (Gastropoda : Streptoneura) inhabit the Pacific Coast of North America. The genus *Thais* is represented by 4 species, namely, *T. lamellosa* (Gmelin, 1791), *T. lima* (Gmelin, 1791), *T. emarginata* (Deshayes, 1839), and *T. canaliculata* (Duclos, 1832). Although these are customarily recognized as four distinct species, Kincaid (1957, 1964) considers the last three as only "morphs" of a single polytypic species, *T. lima*. *Thais lamellosa* and *T. canaliculata* are easily distinguished but specimens of *T. lima* and *T. emarginata* show intergradation in shell morphology and are difficult to tell apart.

The West Coast species and morphs of *Thais* are extremely abundant on exposed and sheltered rocky coasts. They display a wide variety of form, sculpture and color. A pelagic larval stage is absent and the young animals emerge from egg capsules which are deposited in large numbers by the snails almost throughout the year. The dispersal of these snails would seem to be restricted to the immediate vicinity where they emerge from egg capsules. The presence of mud or sand around rocks and increasing depths constitute barriers for their migration. As a consequence "microgeographical" populations are established on different islands and even on isolated stretches of land on the same beach. The conditions for genetical differentiation are highly favorable in such populations.

We have undertaken an investigation of the chromosomes of the above named species of *Thais* from the West Coast of the United States in order to elucidate the cytogenetic structure of their microgeographical populations. A previous study of similar populations of the European *T. lapillus* (Linnaeus, 1758) by Staiger (1954, 1957) indicated the existence of numerical and structural chromosome polymorphism. The extreme forms of this species occurring on exposed and sheltered beaches possessed haploid numbers of 13 and 18 respectively and forms present on intermediate wave exposed beaches had intermediate numbers. Centric fusions due to reciprocal translocations were shown to be responsible for the Robertsonian nature of the chromosome polymorphism. Nishikawa (1962) examined 3 species of *Thais*, *T. bronni* (Dunker, 1860), *T. clavigera* (Küster, 1858), and *T. luteostoma* (Holten, 1802) from Japan and found 30 to be the common haploid number. He did not find any numerical chromosome polymorphism.

We have examined chromosomes from oocytes obtained from egg capsules. The egg capsules of the 4 species were collected from the coastline of the States of Washington, Oregon and California. The standard aceto-orcein squash technique of chromosome preparations was routinely used. Although *Thais lima* and *T. emarginata* capsules contain nurse eggs, *T. lamellosa* does not and the shape and size of its egg capsules and the number and size of its oocytes

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also differ from the other two. We found that *T. canaliculata* egg capsules and oocytes possess a greater resemblance to those of *T. lamellosa* rather than to those of *T. lima* and *T. emarginata.*

A haploid chromosome number of 35 is common to the 4 species. Three other marine gastropod species, *Ceratostoma (Purpura) foliatum* (Gmelin, 1791), *Ocinebra japonica* (Dunker, 1860) and *Fusitriton oregonensis* (Redfield, 1848), which were examined by us also share this number. In prometaphase and metaphase-I plates 35 bivalents were counted with clarity. In all cases a definite prometaphase stretching of bivalents was observable (Plate 43, Figures 1 and 2) as in *Thais lapillus* (Staiger, 1954). In the 4 species of *Thais,* the prometaphase bivalents may stretch as long as 40μ or more. Bivalents were generally rod-like, formed by acrocentric (subterminal) or telocentric (terminal) chromosomes and possessed a single chiasma at prometaphase or metaphase-I. Associations of meiotic bivalents, such as quadrivalents and, in some cases, linear trivalents, were observed so that meiotic plates were polymorphic for interchanges or translocations. In a total of 100 animals or more the chromosome number was usually N = 35.

In mitotic plates of the 4 species 70 chromosomes were usually seen. The majority of chromosomes were acrocentric or telocentric but metacentrics were present. The chromosome number is very large and difficult to work with. A detailed study of the meiotic and mitotic chromosomes of several populations is being made despite this difficulty.

This study of egg capsules, oocytes, and chromosomes of several populations of *Thais* forms and species throws some light on the confused status of their taxonomy and interrelationships. We are inclined to conclude tentatively that while *T. lima* and *T. emarginata* may be the morphs or forms of the same species, *T. lamellosa* and *T. canaliculata* are distinct species and perhaps closer to each other than to *T. lima* and *T. emarginata.* Kincaid's suggestion (1964) that *T. lima, T. emarginata* and *T. canaliculata* be consolidated under one species may be valid only for the first two of this series. *Thais canaliculata* shows considerable differences in shell morphology, shape of egg capsules and number and size of oocytes.

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